



## Brown & Root Environmental

N62661.AR 000776  
NAVSTA NEWPORT RI  
5090 3a  
55 Jonspin Road  
Wilmington, MA 01887-1062

Phone (508) 658-7899  
FAX (508) 658-7870

C-52-11-6-3356W

November 15, 1996

Project Number 6884

Mr. James Shafer  
Remedial Project Manager  
Northern Division, Naval Facilities Engineering Command  
10 Industrial Highway, Mail Stop 82  
Lester, Pennsylvania 19113

Reference: CLEAN Contract No. N62472-90-D-1298  
Contract Task Order No. 0254

Subject: Response to Comments, Draft Marine Ecological Risk Assessment Report  
Former Derecktor Shipyard, Naval Education & Training Center, Newport Rhode Island

Dear Mr Shafer:

Enclosed are four copies of responses to comments received from the Rhode Island Department of Environmental Management on the report referenced above. The comments were received on October 8, 1996. This material has been forwarded to Paul Kulpa at the RIDEM as indicated on the distribution list.

You will recall that at EAB Meeting No. 9, the EPA agreed not to require a revision and resubmittal of the preliminary responses to their comments. Therefore, we are proceeding with the completion of the Draft Final ERA report, and assume that as of this date, no additional information will be forthcoming from the EPA and DEM that will require incorporation into that report.

If you have any questions regarding this submittal, please do not hesitate to contact me.

Very truly yours,

Stephen S. Parker  
Project Manager

SSP/ib

Enclosure

c: B. Wheeler, NETC Newport (w/encl - 2)  
P. Kulpa, USEPA (w/encl - 4)  
J. Trepanowski/M. Turco, B&RE (w/encl)  
File 6884-3.2 (w/o encl), 8.0 (w/encl)

1868

**RESPONSE TO RIDEM COMMENTS**  
**DRAFT DERECKTOR SHIPYARD ECOLOGICAL RISK ASSESSMENT**  
**NAVAL EDUCATION AND TRAINING CENTER, NEWPORT, RHODE ISLAND**

*Cover Letter.*

*The Division has reviewed the Ecological Risk Assessment for Derecktor Shipyard. In general, the Office is concerned with the basis of the risk assessment, in terms of low priorities for protection of indigenous non-endangered species and inadequate consideration of future use of the site. In addition, there are a number of concerns with the relative risk analysis for the various stations.*

*Response:*

Previously employed risk categories by Suter *et al* are no longer being used to characterized risk. The basis for the risk assessment, e.g. indigenous non-endangered vs. endangered species, will be clarified per EAB Meeting #9 agreements, i.e. the risk categorizations have and will be based primarily on the protection of indigenous species. The ERA will also be revised to indicate that the assessment only reflects currently existing conditions, and that altered risks under future use scenarios should be considered as part of the Feasibility Study.

*Comment 1.*

*The findings of the ecological risk assessment indicate that the levels of contaminants in the sediments at the site are significant. However, due to site conditions the document concludes that a number of these contaminants are not bioavailable and therefore do not pose a significant threat to the environment. In addition, the lack of endangered species results in low to moderate risk. This conclusion is based upon the premise that present site conditions at the site will prevail and non endangered species do not require the same degree of protection. Low bioavailability requires the assumption that the break water north of the site will be maintained, thereby continuing this area as a deposition zone, and the site will remain inactive. Neither of these conditions may hold true. As you are aware this site has been considered for redevelopment. In addition, use of the site as a shipyard or use of the piers for large vessels will significantly change conditions at the site. Amongst other things it will allow the contaminants to become bioavailable. This change in conditions will affect the conclusions drawn in the ecological risk assessment. Since redevelopment of this area is likely, the ecological risk assessment should consider this scenario.*

*Response 1.*

As indicated in the Response to the Cover Letter comment 1, The ERA will be revised to indicate that the assessment only reflects currently existing conditions, and that altered risks under future use scenarios should be considered as part of the Feasibility Study. As agreed at the EAB meetings 8 and 9, Suter's definitions for presenting risk categories within the risk characterization will no longer be used; therefore, the presence or absence of endangered species will not be used as a risk ranking criteria.

*Comment 2.*

*Clarification is requested on the overall risk characterization of the report. At a number of stations certain test parameters were high yet the stations received an overall low risk ranking. Therefore, a section should be added which discuss how the overall risk for the sampling station was determined.*

*Specifically, the section should include a discussion of the following; discuss whether the different test received the same weight, (that is whether chemical data was considered more important than tissue data or the results of field observations etc), justification for weighing the different test equally or differently, etc.. Finally, the report should include a brief discussion of each sampling station and the rationale for the overall risk assigned to that station. This would clarify what appear to be apparent discrepancies in the risk ranking, that is locations with high relative risk for certain parameters were given a overall low risk ranking. Please be advised that concerns relating to rating, such non-bioaccumulation of measured PAHs, TBT issues, etc should be addressed in the risk ranking.*

Response 2.

Section 6.6 of the document will be revised to add additional discussion of the risk ranking adopted for each station. It will be further emphasized that each endpoint received equal weight in the overall assessment. The issue of non-bioaccumulation of PAHs in fish due to PAH metabolism will be addressed relative to Tissue Screening Concentration and Critical Body Residue Hazard Quotients results by noting in the text that the derived values may not be conservative with respect to true exposure conditions because the fish may metabolize PAHs to daughter compounds which are not analyzed.

Comment 3.

*The Division does not agree with the conclusion that "There does not appear to exist severe risk at any of the stations sampled for the Dereecktor Shipyard Marine ERA"(p.6-56). The risk categories are biased by the endangered species requirement. The moderate risk in many cases is a severe risk when local species are considered as important. Rhode Island values the local marine biological community, and believes it should be protected from severe impacts whether listed as endangered species or not. The near-shore stations DSY-29, -40, -41, -28, and -27 all seem to have a lot of localized-source related problems. The categorization scheme needs to be revamped, and resuspension impacts need to be considered in any evaluation.*

Response 3.

The risk ranking will be modified as agreed at EAB meetings #8 and #9 (i.e. relative rankings of low, intermediate and high will be applied; see also comment 1, above). Resuspension impacts were considered in the ERA through evaluation of elutriate chemistry and toxicity as well as deployed mussel tissue residues as noted in the work plan. However, future use scenarios that might result in sediment resuspension of > 18 cm depth were not considered and this will be noted.

Comment 4.

*The report includes a brief description of each of the test parameters. Where appropriate the report should list the known false positive or negatives associated with each of these parameters.*

Response 4.

The Navy agrees with the RIDEM request for additional information with regard to the uncertainty associated with the toxicity test endpoints and will elaborate on possible false positive/negative results in the uncertainty discussion of Section 5.

- Comment 5. *The Division recommends adding a figure which includes a number of key parameters. This would allow the reader to compare the results of the various tests. The Division has created a figure which includes eight parameters for the surface sediment and core samples.*
- Response 5. The requested figure(s) will be added, and will include the summary information for each of the endpoints supporting weight of evidence results presented in Table 6.6-3.
- Comment 6. *The report discusses separately the various geophysical processes observed in the cove. The report should note whether the various observed physical and chemical parameters are in concert. That is whether the observed velocities, current flow paths, etc, corresponded with the sediment distribution, dissolved oxygen levels, etc. The report should note any discrepancies.*
- Response 6. Summary text will be added to compare and contrast the results of geophysical, hydrographic and dissolved oxygen model data sets.
- Comment 7. *Through out the report the results of the various test are compared to the reference stations. The report should therefore include a more elaborate discussion of these stations, including an expanded discussion of all past and present potential sources of contamination at these stations, (for example boat maintenance may have occurred at the Castle Hill Station).*
- Response 7. Discussion will be added to provide greater information on the reference locations as requested.
- Comment 8. *During an underwater investigation conducted at the site, Naval divers filmed an area named the "Dead Zone". This area was devoid of life and was subsequently subject to investigation. The ERA does not adequately address this zone. The location of the zone should be depicted on all appropriate figures and narrative discussion of the zone should also be included.*
- Response 8. In the Site Characterization Section (Section 3.1), it will be noted that a diver survey conducted prior to the ERA investigation noted an apparent lack of benthic life forms in the Derecktor enclosure area. Based on this observation, sediment and biota sampling locations were added (DSY-40 and DSY-41) to characterize possible ecological risks in this area.
- Comment 9. *The risk assessment notes the results of previous investigations. It is the Division's understanding that geophysical investigations were performed when the shipyard was active. If this is the case, the results of these investigations should be noted in the report.*
- Response 9. The Navy is not aware of a bathymetry study conducted by Bob Derecktor or other previous geophysical investigation work at the site other than that already identified in the ERA report. However, the Navy is aware of an SAIC study conducted for the Department of Justice with the objective of identifying the presence of sandblast material related to the site, and the results of this investigation will be acknowledged in the ERA report. If RIDEM provides the

Navy with a copy of the bathymetry study apparently conducted by Bob Derecktor, the findings of the study will be mentioned in the ERA report.

*Comment 10. If possible please provide a copy of the report to the Division on computer disk in Word Perfect Format. Graphs and tables may be submitted in a suitable database form.*

**Response 10.** The Navy agrees to provide RIDEM with an electronic copy of the document once the report becomes a Final document.

*Comment 11a. Section 1.4.1, Sediment Contaminants Page 1-5, 1st line. There does not appear to be enough information to judge how well the WASP5 run reflects actual conditions. Furthermore, the model obviously cannot account for benthic community impacts from the conclusions of the report that benthic/DO problems were the impact driver for the abnormal benthic sample results for stations such as DSY - 40, 41, 29, etc. It is therefore incorrect to state that low DO does not pose a threat.*

**Response 11a.** The WASP5 modeling results were shown to predict water column dissolved oxygen concentrations. The text will be revised to amplify that the WASP5 modeling results are not sufficient to account for indications of low localized DO at a particular station, but rather the model results indicate that the cove as a whole is not likely to be impacted by low DO. It will also be noted that the apparent risk of low DO at specific stations was based on direct visual observations of shallow sediment redox discontinuity depth, not the modeled result.

*Comment 11b. In addition, there are puzzling issues related to low depth redox, DO issues etc. at several stations. For example, p.1-7 indicates that DSY-40 has low organic content, yet redox levels/benthic DO environment is indicated in the risk assessment as the source of the degraded benthic community. If little organic carbon, what is driving the shallow redox? p.1-13, last ¶ indicates that organic enrichment is thought to occur at sta.-40 and -41. The report should indicate why there is low organic carbon. Also, is this the "dead zone" referred to in the Navy diver film? It is not referenced anywhere in the maps or text where that area is within the sampling program.*

**Response 11b.** Additional text will be added to the report postulating that the observed low benthic dissolved oxygen (DO) most likely driven by episodic events of stagnant circulation and high water column biological oxygen demand despite a lack of sediment oxygen demand. Periods of rapid flushing, perhaps related to storm drains or wind patterns may cause scouring of sea floor and removal of fines which comprise most of the sediment TOC concentrations. The Navy agrees to revise the corresponding text in the ERA report to acknowledge the occurrence of low benthic DO concentrations without solely attributing the apparent ecological stress to this condition. The so-called "dead zone" will be identified as indicated in the response to comment 8, above.

Comment 12. Section 1.4.1, Sediment Contaminants, Page 1-6 2nd Paragraph, last sent.

*"and therefore are not bioavailable..." - Add: "under present (redox) conditions"...*

Response 12. The suggested text will be revised as follows:

*"The remaining 14 Coddington Cove stations and reference Station JPC-1 had low SEM/AVS and relatively abundant AVS, indicating that metals are likely to be sequestered in insoluble sulfides and therefore are not bioavailable within most of the study area under present (redox) conditions."*

Comment 13. Section 1.4.1, Sediment Contaminants, Page 1-7, last Paragraph last line:

*These results showing "unique source" PCBs at DSY-29 should be considered seriously during the final conclusions concerning response plans/actions. These issues are not adequately addressed when discussing risk and risk sources in Ch.6.0. This station area appears to provide significant risk, and it appears to be local sources v. discharges from out in the Bay/WWTFs, etc.*

Response 13. The issues raised in this comment will be addressed once the results of the onshore investigation become available. This comment also relates to risk management decisions.

Comment 14. Section 1.4.2, Tissue Residue, Page 1-9, 2nd full Paragraph - 3rd line + last Paragraph and other places: - *"were, in general, comparable to or only slightly higher than those from Reference Stations..."* - This statement is very difficult to interpret - Please give an idea in the text such as *"never exceeded 1.5X ref sta. levels or a % of reference values v. "in general...comparable to"*.

Response 14. At the 10/16/96 EAB meeting #9, RIDEM agreed with EPA's position that only qualitative comparison statements are acceptable for the Executive Summary section of the ERA report. Therefore, no change is required.

Comment 15. Section 1.5, Risk Characterization, Page 1-20, top lines:

*The Division questions whether it is appropriate to essentially put low weighing on TBT results due to lack of ER-L or ER-M values. The test results suggest that the levels of TBT are well above the "degraded condition" value previously mentioned of 5 ng Sn/g for at least some stations. The Navy should attempt to provide some sort of benchmark for this important shipyard-related pollutant. This may be an important CoC since mussels and other bivalves at some stations were shown to be accumulating it from TCR analyses Figs 6.2-1A, 6.2-2A, & 6.2-3A, as was noted on p.1-21 top line.*

Response 15. The executive summary will be revised/expanded to identify the value that was used as a sediment "benchmark" for TBT, as discussed in Section 6.1 (p. 6-2). In addition, the discussion of the findings in the risk characterization section will be revised to include further discussion of risk associated with the presence of elevated levels of TBT in tissues of target receptors, as discussed in Section 6.2 (p. 6-11). Finally, these results, as presented in Section 6.6, will be summarized in the Executive Summary.

Comment 16. Section 1.5, Risk Characterization, Page 1-21, 2nd full Paragraph:

*CBRs are not acceptable measures of risk from PAHs for vertebrates like fish since they are rapidly broken down into metabolites which the Navy did not measure, yet they can be significant risks for increased neoplasia and other pre-cancerous tissue indicators. This method will underestimate the risk from PAHs to vertebrates.*

Response 16. As indicated in the response to Comment 2, above, the issue of non-bioaccumulation of PAHs in fish due to PAH metabolism as an uncertainty in the interpretation of Tissue Screening Concentration and Critical Body Residue Hazard Quotients results will be discussed in the revised report (see also Comment response 2.)

Comment 17. Section 1.5, Risk Characterization, Page 1-22 top, last sentence:

*Attributing the high Cu levels in inshore organisms to the Newport WWTF is not acceptable interpretation because Fig.6.1-11 clearly shows that the sediment Cu source is localized and greatest close to shore (Sta. 27-32) and not from an outer cove source.*

Response 17. The text on p. 1-22 will be revised as follows:

*"High Cu tissue residues found in lobsters from specific sampling areas may suggest that fresh water sources from outfalls near Station DSY-25, as well as from the Newport WWTF near Stations DSY-38 and DSY-39, could be a source of copper to these regions, given that sediment concentrations were at or below reference site sediment Cu concentrations. At Station DSY-27, however, sediment Cu was elevated, indicating an additional potential source of Cu to lobsters is likely at this location. There does exist uncertainty in this exposure assumption, however, given that lobster are mobile species such that the primary chemical exposures may not necessarily have occurred at sampled location."*

Comment 18. Section 1.5, Risk Characterization, Page 1-25, Benthic Comm. Structure:

*Does the organic carbon level at these stations reflect the hypothesis of organic enrichment? Also, organic enrichment is not necessarily from sewage discharge, but may be from a local source such as illegal toilet plumbing into storm drains as well as storm water runoff itself. Please acknowledge these other possibilities.*

Response 18.

The ongoing onshore investigative work at the site has thus far not identified any illegal toilet plumbing into the storm drains. The term "sewage-associated" will be deleted from the existing text and new text inserted, to read:

"Near-bottom hypoxia or organic enrichment may be playing a role in altering benthic community structure at these stations. Potential sources of organic loading to Coddington Cove are not well characterized, but may include storm water runoff, illegal toilet plumbing into storm drains in the vicinity of the site, and treated sewage discharges into Narragansett Bay. Station DSY-35 had..."

Comment 19a.

*Section 1.7, Risk Summary and Uncertainty, Page 1-27:*

*As noted above, several of the "weights of evidence" such as CBRs for PAHs and the lack of HI for TBT tend to bias these results to dilute the potential risk from these important CoCs.*

Response 19a.

The Navy acknowledges that CBR data for indicating potential risk of PAHs in fish may be under-represented, and this will be acknowledged in the discussion of uncertainty. However, literature data (Tracey and Hansen, 1996) does show that bioaccumulation of PAHs in benthically-coupled fish and bivalves are similar, suggesting that PAH metabolism does not dramatically alter observed residue concentrations to the point where a significant PAH exposure in benthically-coupled fish would go undetected because of metabolism activity. The Navy disagrees that TBT data are under-represented, as sediment HQ data for TBT are carried through risk characterization and given equal weight with other CoCs.

Tracey, G. A. and D. J. Hansen, 1996. Use of Biota-Sediment Accumulation Factors to Assess Similarity of Non-ionic Organic Chemical Exposure to Benthically-coupled Organisms of Differing Trophic Mode. Archives of Environmental Contamination and Toxicology 30 (4): 467-475.

Comment 19b.

*Later chapters suggest that levels are significantly above reference values (e.g., p.6-7 TBT in mussels > 2x ref at most stations. Yet later conclusions suggest metals may drive risk at some stations although metal residue levels were often less than the TBT results. PAH and TBT risks need to be better included in the weighing process since they appear to be weighted too low under the present effort.*

Response 19B.

The perceived discrepancy can be explained by differences in the premise upon which the three tissue-based endpoints (TCRs, TSC-HQs and CBR-HQs) are based. Whereas the TSC-HQs and CBR-HQs are predictors of effects of CoC residues on the organism, the TCR endpoint is only a measure of exposure, and the Navy acknowledges that it was inappropriate to group all these different endpoints together in the same overall weight of evidence. In addition, the Navy believes that the data presentation for TCR and TSC results (i.e., reporting of only mean and maxima for CoC/receptor pairs) is insufficient to communicate the important CoC risk drivers.

To clarify the presentation and roll-up, the TCR results will be presented for all station/CoC/receptor pairs as shown in replacement Table 6.2-1 (attached), and will now be rolled up into a revised exposure-based weight of evidence



summary table (Table 6.6-1), which is in preparation. (Note that the TCR data, as an exposure indicator, will be removed from Table 6.6-2, which is also being revised). The analyte lists for TCRs has been expanded to match that for sediment HQs (previously, the TCR list included only those CoCs for which TSC benchmarks were available). Tables 6.2-2 and 6.2-3 (attached), which present TSC-HQ and CBR-HQ results, respectively, have also been revised to show all station/CoC/receptor pairs, and these findings are rolled up into a new Tissue Residue Effects summary Table 6.2-4 (also attached). These summarized residue effects will be rolled up into a revised effects-based weight of evidence summary table (Table 6.6-2), which is also in preparation. Finally, Table 6.6-3 will also be revised to reflect the changes to Tables 6.6-1 and 6.6-2.

From the results of Table 6.2-1, it can be seen that TBT residues in indigenous mussels were found to be three-fold higher than reference (TCR > 3) at Stations DSY-27 and DSY-35. No other species/sample exhibited as high a level of TBT. Elevated Tissue Screening Concentration (TSC) HQs were also observed for some TBT/receptor pairs; however, from Table 6.2-2, it can be seen that copper is the primary risk driver of tissue residue effects, while TBT contributes risk comparable to the other metals, and never exceeds that of copper. The greater risk from copper than from TBT is because the benchmark for effects is lower for copper than for TBT. The text will be revised to reflect changes presented in the revised tables.

Comment 20.

Section 1.7, Risk Summary and Uncertainty, Page 1-28:

*The Division questions with the categorization of "severe risk" to only apply to threatened and endangered species. Rhode Island does not have a Natural Heritage for marine threatened and endangered species, (the program only addresses terrestrial species). There is only limited and disjointed information on certain species, such as the fact that Ridley turtles have been tracked by researchers to the Newport Bridge. However, no RI list exists for the State marine species. This rare and endangered species concept usually applies to new activities in an area, not cleanup, where such species are unlikely to be found. The impacts in terms of risk severity should reflect risk to the normally expected marine fauna, not a special group of organisms listed by one federal agency based on rarity.*

Response 20.

Risk characterization definitions will be revised as follows (as proposed in the response to comments from the U.S. EPA):

*"Baseline risk is defined as the probability of adverse ecological effects equivalent to that from contamination and other environmental conditions not associated with the site.*

*Low probability of ecological risks suggests possible, but minimal impacts based on some of the exposure or effects-based weights of evidence, while impacts are undetectable by the majority of exposure and effects-based weights of evidence. Low probability of risk typically lacks demonstrable exposure-response relationships.*

*Intermediate probability of ecological risk falls between high and low probabilities of risk. The intermediate risk probability is typically associated with multiple exposure or effects weights of evidence,*

suggesting that measurable exposure and or effects are occurring at the site, but not both, and typically, quantitative exposure-response relationships are lacking. Intermediate risk probability may also be indicated if the spatial extent of apparent impact is highly localized (e.g., a single station) or the impact may occur for periods of very limited duration.

*High probability of ecological risk is that suggested by numerous weights of evidence which indicate pronounced contaminant exposure and effects, as well as demonstrable exposure-response relationships. High probability of risk may also exist if the spatial extent of apparent impact is great, or the impact is likely to be persistent over long periods of time."*

Definition adapted from Suter et al will not be employed, as indicated in the response to Comment 1.

Comment 21.

*Section 1.7, Risk Summary and Uncertainty, Page 1-29 bottom:*

*As noted previously, if hypoxia is the local driver for sta 40 & 41 why is sta.41 96% sand? One would expect very high SOD/ Organic Carbon in such sediments in order to drive what appears to be a substantial and continuing stressor at these stations. Also, as noted above, the nutrient source is likely to be much more local and related to the storm drains v. offshore discharge source.*

Response 21.

As identified in Comment Response 11, additional text will be added to the report postulating that the observed low benthic dissolved oxygen (DO) is most likely driven by episodic events of stagnant circulation and high water column biological oxygen demand despite a lack of sediment oxygen demand. Periods of rapid flushing, perhaps related to storm drains or wind patterns, may cause scouring of the sea floor and removal of fines which would otherwise contribute to the sediment TOC concentrations. The Navy agrees to revise the corresponding text in the ERA report to identify the possibility that low benthic DO concentrations may occur that are not driven by sediment oxygen demand.

Comment 22.

*Section 1.7, Risk Summary and Uncertainty, Page 1-30, Whole Section:*

*The likely reuse of the area needs to be considered in this risk assessment as with all risk assessments. Here, the likely reuse is as a boat basin with boatyard related activities in the future. This means deep draft vessels which have a high likelihood of being capable of resuspending sediments with their props, etc. Therefore, impacts following possible resuspension need to be considered in the risk assessment.*

Response 22.

Resuspension impacts were considered in the ERA through evaluation of elutriate chemistry and toxicity as well as deployed mussel tissue residues as noted in the work plan. However, future use scenarios that might result in sediment resuspension of > 18 cm depth were not considered and this will be noted.

Comment 23.

*Section 4.2.4, Dissolved Oxygen Modeling for Coddington Cove, Page 4-22, 3d paragraph:*

*This section of the report discusses the importance of AVS. In this assessment the critical benchmark is 0.5. The report indicates that this value is considered to be conservative. In order to make the reader aware of recent developments in this area the report should note that the previous bench mark was 1.0 and now 0.5 is considered to be the appropriate value.*

Response 23.

The Navy assumes that this comment actually refers to the SEM/AVS discussion on page 4-22 that belongs to Section 4.3.1.1. The text presently indicates that, while 1.0 is generally used as an indicator of bioavailability of metals, the value of 0.5 has been used to conservatively estimate the bioavailability of metals. The text will be revised, as below, to better present this concept:

*"Until recently, if the SEM/AVS ratio was greater than one (>1), metals have generally been assumed to be bioavailable. However, based on recent scientific developments and due to the seasonal variations in AVS (minimum values in winter), SEM/AVS values greater than 0.5 were conservatively interpreted in this study as indicative of potential bioavailability."*

Comment 24.

*Section 4.3.3.1, Sediments, Page 4-20, Paragraph 2.*

*This section of the report appears to state that normalization to aluminum is carried out to account for lithogenic effects with respect to grain size, that is normalization should reduce the influence to grain size. This discussion needs to be expanded. Specifically, for the metals of concern the report should indicate whether grain size normalization will inappropriately reduce the levels of metals which were anthropogenic introduced. In addition, the report should note whether this normalization is for dried weight samples and the ramifications of performing this procedure.*

Response 24.

The text on p. 4-20 of the report will be revised to indicate that aluminum normalization on a dry weight basis is an accepted and commonly used technique to account for lithogenic effects with respect to grain size. Recent literature will be cited, specifically, Summers et al., 1996, who concluded: "Normalization of metals concentrations to Al is useful in estimating the natural component of most metals in estuarine sediments" and "The use of normalized metal concentrations should be employed to determine areas with a significant influence on the environmental condition and decisions related to resource management". The report will be revised to indicate that the normalization is for dried weight samples and note that this is the accepted procedure. The text will be revised as follows:

*"In this study, anthropogenic trace metal concentrations were normalized to the concentration of the lithogenic metal aluminum. Normalization of metals concentrations to aluminum allows for estimation of levels of naturally occurring metals in estuarine sediments. The primary assumption of the normalization method is that aluminum is most abundant in fine sediments (clays and silts) and*

therefore the normalized values will be relatively lower for fine sediments and relatively higher for coarse sediments (sand). Overall, the normalization should significantly reduce the influence of grain size and allow more accurate determination of the spatial distribution of trace metals in the environment relative to possible point sources of contamination."

Summers, J. K., T.L. Wade, V.D. Engle and Z.A. Malaeb, 1996. Normalization of metal concentrations in estuarine sediments from the Gulf of Mexico. *Estuaries* 19(3) 581-594.

Comment 25.                      Section 4.3.3.1, Sediments, Page 4-21, Paragraph 1:

*This section of the report discusses MEF relative to Station 39. This station was chosen based on the premise that it was least affected by the shipyard and still reflect regional concentrations. With respect to the latter the report should discuss the concentrations observed at this station with that of the controls.*

Response 25.                      The report will be expanded to include comparison of Station 39 metals concentrations with the reference sites in order to support the minimal impact assumed for Station 39.

Comment 26.                      Section 5.3, Biological Field Investigations, Whole Section:

*This section of the report deals with the biotic condition analysis conducted at the site. In addition to listing the different species found at the sampling locations the report should note which species are pollution tolerant and intolerant. Furthermore, the report should include a narrative which discusses whether the organisms found at a particular sampling station was composed of primarily pollution tolerant or intolerant species and the importance of these observations.*

Response 26.                      As indicated at EAB meeting #9, some of the benthic species present may be pollution tolerant, but the certainty of this assumption is insufficient to assume these species are not reliable pollution indicators. *Capitella*, however, is a true pollution indicator, though it was not present in relation to Derecktor Shipyard. The report will be revised to indicate that the commonly acknowledged pollution indicator species were not observed at the site and thus could not be used to evaluate site conditions. In addition, the potential influence of physical parameters on the benthic community structure will be further acknowledged.

Comment 27.                      Section 5.3, Biological Field Investigations, Whole Section:

*The section of the report compares the number and type of species found at the different sampling stations to that found at the reference stations. Comparisons of this nature are normally carried out using Shannon Weiner Diversity Analysis or other similar analysis. The report should be modified accordingly.*

Response 27.

The benthic community endpoints are generally less sensitive to pollution than the other measured endpoints, and the Shannon-Weiner index has generally been determined to be somewhat inadequate for benthic community assessments. Thus, the addition to or replacement of the present approach with a Shannon Weiner Diversity Analysis will not be conducted. However, differences in sediment characteristics among stations should necessarily be taken into consideration, and the discussion of benthic community results in the report will be expanded to address this issue.

Comment 28.

*Section 6.1.2, Elutriate Contaminants, Page 6-5:*

*This and other sections of the risk assessment includes the results from a series of dilutions from the elutriate test. The report should note the significance of the dilutions. In addition, the risk assessment should note whether the concentrations representing 100% elutriate is in fact a dilution in itself.*

Response 28.

The statistical significance of the elutriate test series presented in the revised Table 5.2-1 (attached) identifies whether the exposure response relationship of the test sediment is different (i.e. lower) than the performance control. In this method of identification, no specific individual dilution result needs to be significantly reduced from the performance control for the overall relationship to exhibit significance. The Navy considers this to represent the most conservative approach. The environmental significance of the dilutions (including 100% elutriate) will be discussed relative to the suspended solids concentrations achieved during the elutriate preparation, and their relevance to expected concentrations in the field under resuspension scenarios will be added as an uncertainty issue on p. 6-6 of the report. In order to provide further emphasis on the more toxic elutriate samples, the ranking of " + + + " has been added for samples with IC<sub>10</sub> values <10%.

Comment 29.

*Section 6.2.2.1, Tissue Screening Concentration Assessments, Page .6-11, Bottom*

*The fact that lobster is the species at greatest risk should be considered in the evaluation of action responses since this species is allowed as a commercial fishery in the area and will be a component to both possible human exposure and impacts to local economic interests if the population is impacted.*

Response 29.

Further weight-of-evidence discussion on the ecological aspects of the lobster population will be included in the report. However, human health risks are not within the scope of this ecological risk assessment and therefore will not be addressed. Issues regarding the evaluation of remedial action responses pertain to the Feasibility Study phase.

Comment 30.

*Section 6.5.1.2, Sand Bottom Communities, Page 6-35, Top:*

*The Division questions the position that a dominant mat of A. abdita is an indicator of low pollution impacts ("Pollution sensitive sp."). Dr. Gene Gallagher of U.M.A. Bos. indicated at a 1995 MASS BAYS conference that Chesapeake Bay Project results show that when*

*> 70% of total species in the benthic community consist of A. abdita, this is an indication of a degraded environment being colonized by a highly opportunistic species that can rapidly colonize an area following disruptions. The high fecal results are suggestive of a storm drain related source of problems since offshore discharge of the Newport WWTF is chlorinated and has very low fecal count.*

Response 30. The text will be revised to differentiate between eutrophication and contamination induced effects, e.g. the presence of amphipod mats may be related to eutrophic conditions which are separate from CoC-related impacts.

Comment 31. Section 8.0, References, Page 8-19, third reference:

*Tracey G.A. and D.J. Hansen, 1996. The report indicates that the above was found in Achieves of Environmental Contamination and Toxicology 1996, Contribution NO. 1641 US EPA-ERLIN,30(4). The report should note whether this citation as well as any other citation if from peer review literature or approved EPA guidance.*

Response 31. The correct citation is as follows:

Tracey, G. A. and D. J. Hansen, 1996. Use of Biota-Sediment Accumulation Factors to Assess Similarity of Non-ionic Organic Chemical Exposure to Benthically-coupled Organisms of Differing Trophic Mode. Archives of Environmental Contamination and Toxicology 30 (4): 467-475. (Note, this is a peer-reviewed publication).

Comment 32. Appendix D-1, Geophysical Survey Data

*The report includes a description of the vibracore samples collected at the site. However the location of all of the vibracore samples was not include in a figure. The report should be modified accordingly.*

Response 32. A figure indicating the location of the vibracore stations will be added.

Table 5.2-1. Summary of toxicity test results using *Ampelisca* survival, *Arbacia* fertilization, and *Arbacia* larval development for the Derecktor Shipyard Marine Ecological Risk Assessment.

| Sample ID** | 10-Day Solid-Phase Tests<br><i>Ampelisca abdita</i> |                   |                   | Sediment Elutriate Tests<br><i>Arbacia punctulata</i> |                   |                   |                               |                   |
|-------------|---|-------------------|-------------------|---|-------------------|-------------------|-------------------------------|-------------------|
|             | Un-Ionized Ammonia (mg/L)                           | Survival          |                   | Un-Ionized Ammonia (mg/L)                             | Fertilization     |                   | Larval Development            |                   |
|             |   | Mean <sup>1</sup> | Flag <sup>5</sup> |   | Mean <sup>2</sup> | Flag <sup>5</sup> | IC <sub>10</sub> <sup>3</sup> | Flag <sup>5</sup> |
| DSY-25      | 0.95  | 99.0              | -                 | 0.05  | 96.4              | -                 | 30.2                          | ***               |
| DSY-26      | 0.26  | 101.0             | -                 | 0.00  | 102.6             | -                 | 8.91                          | ****              |
| DSY-27      | 0.02  | 78.9              | +                 | 0.03  | 98.4              | -                 | nc                            | -                 |
| DSY-28      | 1.25  | 70.1              | +                 | 0.16  | 94.2              | -                 | 3.34                          | ****              |
| DSY-29      | 0.84  | 94.8              | -                 | 0.08  | 91.6              | -                 | 9.35                          | ****              |
| DSY-30      | ND  | 84.2              | -                 | 0.03  | 96.9              | -                 | nc                            | -                 |
| DSY-31      | ND  | 101.1             | -                 | 0.05  | 92.7              | -                 | 37.6                          | ***               |
| DSY-32      | 0.17  | 96.9              | -                 | 0.03  | 88.6              | -                 | 33.8                          | ***               |
| DSY-33      | 0.26  | 100.0             | -                 | 0.01  | 92.2              | -                 | 19.3                          | ***               |
| DSY-34      | 0.01  | 96.8              | -                 | 0.04  | 88.6              | -                 | nc                            | -                 |
| DSY-35      | 0.01  | 103.2             | -                 | 0.00  | 96.9              | -                 | nc                            | -                 |
| DSY-36      | 0.10  | 99.0              | -                 | 0.02  | 93.8              | -                 | 54.2                          | +                 |
| DSY-37      | 0.26  | 101.0             | -                 | 0.02  | 95.9              | -                 | 25.2                          | ***               |
| DSY-38      | 0.76  | 99.0              | -                 | 0.05  | 95.9              | -                 | 34.4                          | ***               |
| DSY-39      | ND  | 100.0             | -                 | 0.04  | 89.1              | -                 | 25.8                          | ***               |
| DSY-40      | ND  | 100.0             | -                 | 0.01  | 96.9              | -                 | 62.6                          | +                 |
| DSY-41      | 0.33  | 97.9              | -                 | 0.01  | 94.8              | -                 | 39.0                          | ***               |
| JPC-1       | 0.44  | 97.9              | -                 | 0.03  | 98.4              | -                 | nc                            | -                 |
| JPC-2       | 0.09  | 100.0             | -                 | 0.01  | 100.0             | -                 | >100                          | -                 |

Notes:

1 - Percent *Ampelisca* survival in bulk sediment sample. Data normalized to the control.

2 - Percent fertilized *Arbacia* eggs in elutriate of sediment sample. Data normalized to the control.

3 - Estimate of the concentration which would cause a 10% reduction in normal larval development.

Refer to section 5.2.3. of the text for explanation of calculations of the estimated value.

Values are measured as % full-strength elutriate concentration (1:4 sediment/water mixture).

4 - DSY = Derecktor Shipyard, Coddington Cove; JPC = Jamestown Potter Cove

5 - Toxicity Flag Codes:

*Ampelisca* survival: - = no effect; \* = statistically < control; \*\* = statistically < control and 60-80% of control;

\*\*\* = statistically < control and < 60% control; \*\*\*\* = statistically < control and < 10% control.

*Arbacia* fertilization: - = no effect; \* = statistically < control; \*\* = statistically < control and 50-70% of control;

\*\*\* = statistically < control and < 50% control; \*\*\*\* = statistically < control and < 10% control.

*Arbacia* normal larval development: - = not toxic; \* = one or more dilutions statistically < control;

\*\* = <70% Elutriate concentration is toxic;

\*\*\* = <50% Elutriate concentration is toxic.

\*\*\*\* = <10% Elutriate concentration is toxic.

nc = Not calculated.

ND = No data.

Table 6.2-1a. Tissue Concentration Ratio (TCR) Rankings for Target Receptors for the Derecktor Shipyard Marine ERA by Station<sup>1</sup>.

| Station | Species <sup>2</sup> | 2-Methylnaphthalene | Acenaphthene | Acenaphthylene | Anthracene | Benzo(a)anthracene | Benzo(a)pyrene | Chrysene | Dibenz(a,h)anthracene | Fluoranthene | Fluorene | HMW PAHs | LMW PAHs | Naphthalene | Phenanthrene | Pyrene | Total PAHs | Total PCBs | p,p'-DDE | Tributyltin | Arsenic | Cadmium | Chromium | Copper | Lead | Mercury | Nickel | Silver | Zinc | Risk Ranking <sup>3</sup> |
|---------|----------------------|---------------------|--------------|----------------|------------|--------------------|----------------|----------|-----------------------|--------------|----------|----------|----------|-------------|--------------|--------|------------|------------|----------|-------------|---------|---------|----------|--------|------|---------|--------|--------|------|---------------------------|
| DSY-24  | IBM                  |                     |              |                |            |                    |                |          |                       |              |          |          |          |             |              |        |            | +          | +        | -           | +       | ++      | +        | -      | +    | +       | +      |        |      | ++                        |
| DSY-25  | IBM                  |                     |              | ++             | +++        | ++                 | ++             | ++       |                       | +++          | +        | +++      | ++       |             | ++           | ++     | ++         | +          | +        | -           | +       | +       | +        | +      | -    | -       | -      | -      | +    | +++                       |
|         | LOB                  |                     |              |                |            |                    |                |          |                       | ++           |          | ++       | -        |             |              | ++     | +          | +          | -        | -           | +       | +       | +        | +      | -    | -       | +      | +      | -    | ++                        |
| DSY-26  | CN                   |                     | ++           |                |            |                    | ++             |          |                       | ++           | +        | ++       | -        |             | ++           | +      | -          | ++         | +        | +           | +       | -       | -        | -      | -    | -       | -      | -      | +    | ++                        |
|         | DM                   |                     | +            | +              | +          | +                  |                | +        |                       | ++           |          | ++       | +        |             | ++           | ++     | +          | ++         | +        | +           | +       | -       | -        | -      | -    | -       | -      | -      | +    | ++                        |
|         | IBM                  |                     |              | ++             | +++        | +++                | +++            | +++      |                       | +++          | +        | +++      | ++       |             | ++           | +++    | +++        | +          | +        | +           | -       | +       | +        | +      | -    | -       | -      | -      | -    | +++                       |
| DSY-27  | IBM                  |                     |              | +              | ++         | ++                 | +              | ++       |                       | +++          | +        | ++       | ++       |             | ++           | +++    | ++         | +          | +        | ++          | +       | +       | +        | +      | +    | -       | +      | +      | +    | +++                       |
|         | LOB                  |                     |              |                | +          |                    |                |          |                       | ++           |          | ++       | +        |             | +            | ++     | ++         | +          | +        | +           | -       | -       | +        | +      | -    | +       | -      | +      | +    | ++                        |
| DSY-28  | CN                   | -                   | ++           | -              |            | +                  |                |          |                       | ++           | +        | ++       | -        |             | +            | +      | +          | ++         | +        | +           | +       | +       | -        | -      | -    | -       | -      | -      | +    | ++                        |
|         | DM                   |                     |              |                |            | +                  |                | +        |                       | +            |          | +        |          |             | +            | +      | -          | +          | +        | -           | -       | +       | +        | +      |      |         | +      | +      | +    | ++                        |
|         | IBM                  |                     |              | +              | ++         | +                  | +              | +        |                       | ++           | +        | +        | +        |             | ++           | +      | +          | +          | +        | +           | -       | -       | +        | +      | -    | -       | -      | +      | +    | ++                        |
|         | LOB                  |                     |              |                | -          |                    |                |          |                       | ++           |          | ++       | +        |             | +            | ++     | ++         | +          | +        | +           | -       | -       | +        | +      | -    | -       | -      | +      | +    | ++                        |
| DSY-29  | CN                   | -                   | ++           |                |            |                    | ++             |          |                       | ++           | +        | ++       | +        |             | ++           | +      | -          | ++         | ++       | +           | +       | +       | +        | +      | +    | -       | -      | -      | +    | ++                        |
|         | DM                   |                     | +            | -              | +          | +                  |                | +        |                       | +            |          | +        | +        |             | +            | +      | +          | +          | +        | -           | -       | +       | +        | -      | -    | +       | -      | -      | -    | +                         |
|         | LOB                  |                     |              |                |            |                    |                |          |                       | ++           | +        | ++       | +        |             | +            | ++     | +          | -          | +        | +           | -       | +       | +        | -      | -    | +       | +      | +      | +    | ++                        |
| DSY-31  | PM                   |                     |              |                | +          | +                  | +              | +        |                       | +            |          | +        | -        |             | +            | +      | +          | +          | +        | -           | -       | -       | -        | -      | -    | -       | -      | -      | +    | +                         |
|         | DM                   |                     |              |                | +          | +                  | +              | +        |                       | +            |          | +        | -        |             | -            | +      | +          | +          | +        | -           | -       | -       | +        | +      | -    | -       | -      | -      | -    | +                         |
| DSY-32  | PM                   |                     | +            | +              | -          | +                  | -              |          |                       | +            |          | +        | -        |             | -            | +      | +          | +          | -        | -           | -       | -       | -        | -      | +    | +       | -      | -      | -    | +                         |
| DSY-33  | PM                   |                     |              |                |            |                    |                |          |                       | +            |          | -        | -        |             |              | +      | -          | +          | +        | +           | -       | +       | +        | +      | -    | -       | -      | -      | +    | +                         |
|         | DM                   |                     |              |                |            |                    |                |          |                       | +            |          | +        | +        |             | +            | ++     | +          | +          | +        | +           | -       | +       | +        | +      | +    | +       | +      | +      | +    | ++                        |
|         | LOB                  |                     |              |                |            |                    |                |          |                       | -            |          | -        | -        |             | -            | -      | -          | -          | -        | -           | -       | -       | -        | -      | -    | -       | -      | -      | -    | +                         |
| DSY-34  | PM                   |                     |              |                |            |                    |                |          |                       | -            |          | -        | -        |             | +            | -      | -          | -          | -        | -           | -       | -       | +        | -      | -    | +       | -      | -      | -    | +                         |
| DSY-35  | MM                   |                     |              |                | +          | -                  |                | +        |                       | +            | -        | +        | +        |             | +            | +      | +          | +          | +        | -           | -       | +       | +        | -      | -    | -       | -      | -      | +    | +                         |
|         | PM                   |                     |              |                | -          |                    |                |          |                       | +            |          | +        | -        |             | -            | +      | -          | -          | -        | -           | -       | -       | +        | +      | +    | +       | -      | +      | -    | +                         |
|         | IBM                  |                     |              |                |            | +                  | +              | -        |                       | +            | +        | +        | +        |             | ++           | +      | +          | +          | -        | ++          | -       | -       | +        | -      | -    | -       | +      | -      | -    | ++                        |
|         | LOB                  |                     |              |                | -          | -                  | -              | -        |                       | +            |          | -        | -        |             | +            | -      | -          | -          | -        | -           | -       | -       | +        | -      | -    | -       | -      | -      | -    | +                         |
| DSY-36  | PM                   |                     |              |                |            |                    |                |          |                       | ++           | +        | +        | -        |             | +            | +      | -          | ++         | ++       | -           | -       | +       | +        | -      | +    | -       | -      | -      | +    | ++                        |
|         | CN                   |                     |              | -              | +          | -                  | -              | +        |                       | +            | -        | +        | -        |             | +            | +      | -          | +          | +        | -           | -       | +       | +        | -      | +    | +       | -      | -      | +    | +                         |
|         | IBM                  |                     |              |                | +          |                    |                |          |                       | ++           |          | ++       | -        |             | +            | ++     | +          | +          | +        | -           | -       | -       | +        | -      | +    | +       | -      | -      | +    | ++                        |
|         | LOB                  |                     |              |                | +          | -                  | +              | +        |                       | +            |          | +        | -        |             | +            | +      | +          | +          | -        | -           | -       | -       | +        | -      | -    | +       | +      | +      | +    | +                         |
| DSY-37  | PM                   |                     |              |                | +          | +                  | +              | +        |                       | +            |          | +        | +        |             | +            | +      | +          | +          | +        | -           | -       | -       | -        | -      | +    | +       | -      | -      | -    | +                         |
| DSY-38  | PM                   |                     |              |                |            |                    |                |          |                       | +            |          | -        | -        |             | -            | -      | -          | -          | +        | +           | -       | +       | +        | +      | -    | -       | -      | -      | +    | +                         |
|         | DM                   |                     |              |                |            |                    |                |          |                       | +            |          | -        | -        |             | -            | -      | -          | -          | +        | +           | -       | +       | +        | +      | -    | -       | +      | +      | +    | +                         |
|         | LOB                  |                     |              |                |            |                    |                |          |                       | -            |          | -        | -        |             | -            | -      | -          | -          | -        | -           | -       | -       | -        | -      | -    | +       | +      | +      | +    | +                         |
| DSY-39  | DM                   |                     | +            | -              |            | -                  |                | -        | +                     | -            |          | -        | -        |             | -            | -      | -          | +          | +        | -           | -       | +       | +        | -      | -    | -       | -      | -      | +    | +                         |
|         | LOB                  |                     |              |                |            |                    |                |          |                       | -            |          | -        | -        |             | -            | -      | -          | +          | +        | -           | -       | -       | +        | +      | -    | -       | -      | -      | +    | +                         |
| DSY-40  | DM                   |                     | +            | +              | +          | +                  |                | -        |                       | +            |          | +        | +        |             | +            | +      | +          | +          | +        | -           | -       | +       | +        | -      | +    | -       | -      | -      | +    | +                         |
|         | IBM                  |                     |              | +              | +          | -                  | -              | -        |                       | +            |          | -        | +        |             | +            | +      | +          | +          | +        | +           | -       | -       | +        | +      | +    | -       | -      | -      | +    | +                         |
| DSY-41  | MM                   |                     |              | +              | +          |                    | ++             |          |                       | ++           | +        | +        | +        |             | +            | ++     | +          | +          | +        | +           | +       | +       | +        | +      | -    | -       | -      | -      | -    | ++                        |
|         | PM                   |                     |              | +              | +          | -                  | -              | -        |                       | +            | +        | +        | -        |             | -            | +      | -          | -          | -        | -           | -       | -       | +        | -      | -    | -       | +      | -      | -    | +                         |

1 - Species/Station-specific Rankings: TCR>10 = "+++"; TCR>3 = "++"; TCR>1 = "+"; TCR<1 or TCR=1 = "-".

2 - Species: CN=cunner; DM=deployed mussels; IBM=indigenous blue mussels; LOB=lobster; MM=*Mercenaria mercenaria*; PM=*Pitar morrhua*.

3 - Risk Ranking = maximum of species/station-specific rankings.

TCR = ratio of CoC concentration in an organism at the sampling location to the same organism at the reference location.



Table 6.2-1b. Tissue Concentration Ratio (TCR) Rankings for Target Receptors for the Derecoctor Shipyard Marine ERA by Species<sup>1</sup>.

| Species <sup>2</sup> | Station | 2-Methylnaphthalene | Acenaphthene | Acenaphthylene | Anthracene | Benzo(a)anthracene | Benzo(a)pyrene | Chrysene | Dibenz(a,h)anthracene | Fluoranthene | Fluorene | HMW PAHs | LMW PAHs | Naphthalene | Phenanthrene | Pyrene | Total PAHs | Total PCBs | p,p'-DDE | Tributyltin | Arsenic | Cadmium | Chromium | Copper | Lead | Mercury | Nickel | Silver | Zinc | Risk Ranking <sup>3</sup> |     |    |
|----------------------|---------|---------------------|--------------|----------------|------------|--------------------|----------------|----------|-----------------------|--------------|----------|----------|----------|-------------|--------------|--------|------------|------------|----------|-------------|---------|---------|----------|--------|------|---------|--------|--------|------|---------------------------|-----|----|
| CN                   | DSY-26  |                     | ++           |                |            |                    | ++             |          |                       | ++           | +        | ++       |          |             | ++           | +      | -          | ++         | ++       | +           | +       | +       | +        | -      | -    | -       | -      | -      | +    | ++                        |     |    |
|                      | DSY-28  |                     | ++           | -              |            |                    | -              |          |                       | ++           | +        | ++       |          |             | ++           | +      | +          | ++         | ++       | +           | +       | +       | -        | +      | -    | -       | -      | -      | +    | ++                        |     |    |
|                      | DSY-29  |                     | ++           |                |            |                    | ++             |          |                       | ++           | +        | ++       | +        |             | ++           | +      | -          | ++         | ++       | +           | +       | +       | +        | +      | -    | -       | +      | -      | +    | ++                        |     |    |
|                      | DSY-36  |                     |              | -              | +          | -                  | -              | +        |                       | +            | -        | +        | -        |             | +            | +      | -          | +          | +        | +           | -       | +       | +        | -      | +    | -       | -      | -      | -    | +                         |     |    |
| DM                   | DSY-26  |                     | +            | +              | +          | +                  |                | +        |                       | ++           |          | ++       | +        |             | +            | ++     | +          | ++         | ++       | +           | +       | -       | +        | +      | +    | -       | +      | -      | -    | +                         | ++  |    |
|                      | DSY-28  |                     |              |                | -          | +                  |                | +        |                       | +            |          | +        | -        |             | +            | +      | -          | +          | +        | +           | +       | +       | +        | +      | +    | +       | -      | -      | -    | +                         | ++  |    |
|                      | DSY-29  |                     | +            | -              | +          | +                  |                | +        |                       | +            |          | +        | +        |             | +            | +      | +          | +          | +        | +           | +       | +       | +        | +      | +    | +       | -      | +      | -    | +                         | ++  |    |
|                      | DSY-31  |                     |              |                | +          | +                  | +              | +        |                       | +            |          | +        | -        |             | -            | +      | +          | +          | +        | +           | +       | +       | +        | +      | +    | +       | -      | +      | -    | +                         | ++  |    |
|                      | DSY-33  |                     |              |                |            |                    |                |          |                       | +            |          | +        | +        |             | +            | ++     | +          | +          | +        | +           | +       | +       | +        | +      | +    | +       | +      | +      | +    | +                         | ++  |    |
|                      | DSY-38  |                     |              |                | -          |                    |                |          | +                     | +            |          | -        | -        |             | -            | -      | -          | -          | -        | +           | +       | +       | +        | +      | +    | +       | +      | +      | +    | +                         | ++  |    |
|                      | DSY-39  |                     | +            | -              |            | -                  |                | -        | +                     | -            |          | -        | -        |             | -            | -      | -          | -          | -        | +           | +       | +       | +        | +      | +    | +       | +      | +      | +    | +                         | ++  |    |
|                      | DSY-40  |                     | +            | +              | +          | +                  |                | -        |                       | +            |          | +        | +        | +           | +            | +      | +          | +          | +        | +           | -       | +       | +        | +      | +    | -       | -      | -      | -    | +                         | ++  |    |
| IBM                  | DSY-24  |                     | -            | -              | -          | -                  | -              | -        |                       | -            | -        | -        | -        |             | -            | -      | -          | +          | +        | +           | -       | ++      | +        | -      | +    | +       | +      | +      | -    | -                         | ++  |    |
|                      | DSY-25  |                     | ++           | ++             | ++         | ++                 | ++             | ++       |                       | +++          | +        | +++      | ++       |             | ++           | ++     | ++         | +          | +        | -           | -       | +       | +        | +      | +    | -       | -      | -      | -    | +                         | +++ |    |
|                      | DSY-26  |                     | ++           | ++             | ++         | ++                 | ++             | ++       |                       | +++          | +        | +++      | ++       |             | ++           | ++     | ++         | +          | +        | +           | -       | +       | +        | +      | +    | -       | -      | -      | -    | +                         | +++ |    |
|                      | DSY-27  |                     | +            | ++             | ++         | +                  | ++             | ++       |                       | +++          | +        | ++       | ++       |             | ++           | ++     | ++         | +          | +        | +           | +       | +       | +        | +      | +    | +       | +      | +      | +    | +                         | +++ |    |
|                      | DSY-28  |                     | +            | ++             | +          | +                  | +              | ++       |                       | ++           | +        | +        | +        |             | ++           | +      | +          | +          | +        | +           | +       | +       | +        | +      | +    | +       | +      | +      | +    | +                         | +++ |    |
|                      | DSY-35  |                     |              |                | +          | +                  | -              |          |                       | +            | +        | +        | +        |             | ++           | +      | +          | +          | +        | +           | ++      | -       | +        | +      | +    | +       | +      | +      | +    | +                         | ++  |    |
|                      | DSY-36  |                     |              | +              |            |                    |                |          |                       | ++           |          | ++       | -        |             | +            | ++     | +          | +          | +        | +           | -       | +       | +        | +      | +    | +       | +      | +      | +    | +                         | ++  |    |
|                      | DSY-40  |                     | +            | +              | -          | -                  | -              | -        |                       | +            | -        | -        | +        | +           | +            | +      | +          | -          | +        | +           | -       | +       | +        | +      | +    | +       | +      | +      | +    | +                         | +   |    |
| LOB                  | DSY-25  |                     |              |                |            |                    |                |          |                       | ++           |          | ++       | -        |             |              | ++     | +          | +          | -        |             | +       | +       | +        | +      | -    | -       | +      | +      | -    | ++                        |     |    |
|                      | DSY-27  |                     |              |                | +          |                    |                |          |                       | ++           |          | ++       | +        |             | +            | ++     | ++         | +          | +        | +           |         | +       | +        | +      | +    | +       | +      | +      | +    | +                         | ++  |    |
|                      | DSY-28  |                     |              |                | -          |                    |                |          |                       | ++           |          | ++       | +        |             | +            | ++     | ++         | +          | +        | +           |         | +       | +        | +      | +    | +       | +      | +      | +    | +                         | ++  |    |
|                      | DSY-29  |                     |              |                |            |                    |                |          |                       | ++           | +        | ++       | +        |             | +            | ++     | +          | -          | +        | +           | -       | +       | +        | +      | +    | +       | +      | +      | +    | +                         | ++  |    |
|                      | DSY-33  |                     |              |                | -          | -                  | -              | -        |                       | -            | -        | -        | -        |             | -            | -      | -          | -          | -        | -           | -       | -       | +        | +      | +    | +       | +      | +      | +    | +                         | ++  |    |
|                      | DSY-35  |                     |              |                | -          | -                  | -              | -        |                       | +            | -        | -        | -        | -           | +            | -      | -          | -          | -        | -           | -       | -       | +        | +      | +    | +       | +      | +      | +    | +                         | ++  |    |
|                      | DSY-36  |                     |              | +              | -          | +                  | +              | +        |                       | +            |          | +        | -        |             | +            | +      | +          | +          | -        | -           | -       | +       | +        | +      | +    | +       | +      | +      | +    | +                         | ++  |    |
|                      | DSY-38  |                     | -            | -              | -          | -                  | -              | -        |                       | -            | -        | -        | -        | -           | -            | -      | -          | -          | +        | +           | -       | +       | +        | +      | +    | +       | +      | +      | +    | +                         | ++  |    |
| DSY-39               |         | -                   | -            | -              | -          | -                  | -              |          | -                     | -            | -        | -        | -        | -           | -            | -      | -          | +          | +        | -           | +       | +       | +        | +      | +    | +       | +      | +      | +    | ++                        |     |    |
| MM                   | DSY-35  |                     | +            | +              | -          | +                  |                | +        |                       | +            | -        | +        | +        |             | +            | +      | +          | +          | +        | +           | -       | +       | +        | +      | +    | +       | +      | +      | +    | +                         | ++  |    |
|                      | DSY-41  |                     | +            | +              |            | ++                 |                |          |                       | ++           | +        | +        | +        |             | +            | ++     | +          | +          | +        | +           | +       | +       | +        | +      | +    | +       | +      | +      | +    | +                         | ++  |    |
| PM                   | DSY-31  |                     |              | +              | +          | +                  | +              |          |                       | +            |          | +        | -        |             | +            | +      | +          | +          | +        | +           | -       | +       | +        | +      | +    | +       | +      | +      | +    | +                         | ++  |    |
|                      | DSY-32  |                     | +            | +              | -          | +                  | -              |          |                       | +            |          | +        | -        |             | -            | +      | +          | +          | +        | +           | -       | +       | +        | +      | +    | +       | +      | +      | +    | +                         | ++  |    |
|                      | DSY-33  |                     |              |                |            | -                  | -              |          |                       | +            |          | -        | -        |             | +            | +      | -          | +          | +        | +           | -       | +       | +        | +      | +    | +       | +      | +      | +    | +                         | ++  |    |
|                      | DSY-34  |                     |              |                | -          | -                  | -              | -        |                       | -            | -        | -        | -        |             | +            | -      | -          | -          | +        | +           | -       | +       | +        | +      | +    | +       | +      | +      | +    | +                         | ++  |    |
|                      | DSY-35  |                     |              |                |            |                    |                |          |                       | +            |          | +        | -        |             | -            | +      | +          | -          | ++       | ++          | -       | +       | +        | +      | +    | +       | +      | +      | +    | +                         | ++  |    |
|                      | DSY-36  |                     |              |                |            |                    |                |          |                       | ++           | +        | +        | -        |             | +            | +      | -          | ++         | ++       | ++          | ++      | ++      | ++       | ++     | ++   | ++      | ++     | ++     | ++   | ++                        | ++  | ++ |
|                      | DSY-37  |                     |              | +              | +          | +                  | +              | +        |                       | +            |          | +        | +        |             | +            | +      | +          | +          | +        | +           | -       | +       | +        | +      | +    | +       | +      | +      | +    | +                         | ++  |    |
|                      | DSY-38  |                     | -            | -              | -          | -                  | -              | -        |                       | -            |          | -        | -        |             | -            | -      | -          | -          | +        | +           | -       | +       | +        | +      | +    | +       | +      | +      | +    | +                         | ++  |    |
|                      | DSY-41  |                     | +            | +              | -          | -                  | -              | -        |                       | +            | +        | +        | -        |             | -            | +      | -          | -          | -        | +           | +       | -       | +        | +      | +    | +       | +      | +      | +    | +                         | ++  |    |

1 - Species/Station-specific Rankings: TCR>10 = "++++", TCR>3 = "+++", TCR>1 = "++", TCR<1 or TCR=1 = "-".

2 - Species: CN=cunner; DM=deployed mussels; IBM=indigenous blue mussels; LOB=lobster; MM=*Mercenaria mercenaria*; PM=*Pitar morrhua*.

3 - Risk Ranking = maximum of species/station-specific rankings.

TCR = ratio of CoC concentration in an organism at the sampling location to the same organism at the reference location.

Table 6.2-2a. Tissue Screening Concentration Hazard Quotients (TSC-HQ) Rankings for Target Receptors for the Derecktor Shipyard Marine ERA by Station<sup>1</sup>.

| Station | Species <sup>2</sup> | Acenaphthene | Acenaphthylene | Anthracene | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b,j,k)fluoranthene | Benzo(g,h,i)perylene | Chrysene | Dibenz(a,h)anthracene | Fluoranthene | Fluorene | Indeno(1,2,3-cd)pyrene | Naphthalene | Phenanthrene | Pyrene | Total PCBs | p,p'-DDE | Tributyltin | Arsenic | Cadmium | Chromium | Copper | Lead | Mercury | Nickel | Silver | Zinc | Risk Ranking <sup>3</sup> |
|---------|----------------------|--------------|----------------|------------|--------------------|----------------|--------------------------|----------------------|----------|-----------------------|--------------|----------|------------------------|-------------|--------------|--------|------------|----------|-------------|---------|---------|----------|--------|------|---------|--------|--------|------|---------------------------|
| DSY-24  | IBM                  | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | +       | +       | +        | +      | ++   | -       | +      | -      | +    | ++                        |
| DSY-25  | IBM                  | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | +       | +       | +        | ++     | -    | -       | +      | -      | +    | ++                        |
|         | LOB                  | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | +       | +       | +        | ++     | -    | -       | +      | -      | +    | +++                       |
| DSY-26  | CN                   | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | -       | +       | +        | +      | +    | -       | -      | -      | -    | ++                        |
|         | DM                   | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | -       | +       | +        | +      | +    | -       | -      | -      | -    | ++                        |
|         | IBM                  | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | -       | +       | +        | +      | +    | -       | -      | -      | -    | +                         |
| DSY-27  | IBM                  | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | ++          | -       | +       | +        | ++     | +    | -       | +      | -      | +    | ++                        |
|         | LOB                  | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | +       | +       | +        | ++     | -    | -       | -      | +      | +    | +++                       |
| DSY-28  | CN                   | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | +       | +       | +        | ++     | -    | -       | -      | -      | +    | ++                        |
|         | DM                   | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | +       | +       | +        | +      | -    | -       | +      | -      | +    | +                         |
|         | IBM                  | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | -       | +       | +        | +      | +    | -       | -      | -      | -    | +                         |
|         | LOB                  | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | -       | -       | -        | -      | -    | -       | -      | -      | -    | -                         |
| DSY-29  | CN                   | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | -       | +       | +        | +      | ++   | -       | -      | -      | -    | ++                        |
|         | DM                   | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | -       | +       | +        | +      | +    | -       | -      | -      | -    | +                         |
|         | LOB                  | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | +       | +       | +        | ++     | -    | -       | -      | +      | +    | +++                       |
| DSY-31  | DM                   | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | -       | +       | +        | +      | +    | -       | -      | -      | -    | +                         |
|         | PM                   | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | -       | +       | +        | +      | +    | -       | -      | -      | -    | ++                        |
| DSY-32  | PM                   | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | -       | +       | +        | +      | +    | -       | -      | -      | -    | +                         |
| DSY-33  | DM                   | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | +       | +       | +        | +      | +    | -       | -      | -      | -    | +                         |
|         | LOB                  | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | +       | -       | +        | ++     | +    | -       | -      | +      | +    | +++                       |
|         | PM                   | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | +       | +       | +        | +      | -    | -       | -      | -      | +    | +                         |
| DSY-34  | PM                   | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | +       | +       | +        | +      | +    | -       | -      | -      | -    | +                         |
| DSY-35  | IBM                  | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | -       | +       | +        | +      | +    | -       | -      | -      | -    | +                         |
|         | LOB                  | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | +       | +       | +        | ++     | +    | -       | -      | +      | +    | +++                       |
|         | MM                   | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | +       | +       | +        | +      | -    | -       | +      | -      | +    | +                         |
|         | PM                   | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | -       | +       | +        | +      | +    | -       | -      | -      | -    | +                         |
| DSY-36  | CN                   | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | -       | +       | +        | -      | ++   | +       | -      | -      | -    | ++                        |
|         | IBM                  | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | +       | +       | +        | +      | -    | -       | +      | -      | +    | +                         |
|         | LOB                  | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | +       | +       | +        | ++     | -    | -       | -      | +      | +    | +++                       |
|         | PM                   | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | +       | +       | +        | ++     | +    | -       | -      | +      | +    | ++                        |
| DSY-37  | PM                   | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | -       | +       | +        | +      | +    | -       | -      | -      | -    | +                         |
| DSY-38  | DM                   | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | -       | +       | +        | +      | ++   | +       | -      | +      | -    | ++                        |
|         | LOB                  | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | +       | +       | +        | ++     | -    | -       | -      | +      | +    | +++                       |
|         | PM                   | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | -       | +       | +        | +      | +    | -       | -      | -      | +    | +                         |
| DSY-39  | DM                   | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | -       | +       | +        | +      | +    | -       | +      | -      | +    | +                         |
|         | LOB                  | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | +       | +       | +        | ++     | -    | -       | -      | -      | +    | +++                       |
| DSY-40  | DM                   | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | -       | +       | +        | +      | +    | -       | +      | -      | +    | +                         |
|         | IBM                  | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | +       | +       | +        | +      | +    | -       | -      | -      | +    | +                         |
| DSY-41  | MM                   | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | -       | +       | +        | +      | ++   | +       | -      | -      | -    | ++                        |
|         | PM                   | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | -       | +       | +        | +      | ++   | -       | -      | -      | -    | ++                        |
| JPC-1   | CN <sup>4</sup>      | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | -       | +       | +        | -      | ++   | +       | -      | -      | +    | ++                        |
|         | DM                   | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | -       | +       | +        | +      | +    | -       | +      | -      | +    | +                         |
|         | IBM                  | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | -       | +       | +        | +      | +    | -       | -      | -      | +    | +                         |
|         | LOB                  | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | +       | -       | +        | ++     | -    | -       | -      | -      | +    | +++                       |
|         | MM                   | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | -       | +       | +        | +      | +    | -       | -      | -      | +    | +                         |
|         | PM                   | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | +       | +       | +        | ++     | -    | -       | -      | -      | +    | ++                        |
| CHC-1   | CN                   | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | -       | +       | +        | +      | ++   | +       | -      | -      | +    | ++                        |
|         | DM                   | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | +       | +       | +        | ++     | +    | -       | +      | -      | +    | ++                        |
|         | IBM                  | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | +       | +       | +        | ++     | +    | -       | +      | -      | +    | ++                        |
|         | LOB                  | -            | -              | -          | -                  | -              | -                        | -                    | -        | -                     | -            | -        | -                      | -           | -            | -      | -          | -        | -           | +       | -       | +        | ++     | -    | -       | -      | +      | +    | +++                       |

1 - Species/Station-specific Rankings: TSC-HQ>40 = "+++"; TSC-HQ>10 = "++"; TSC-HQ>1 = "+"; TSC-HQ<1 or TSC-HQ=1 = "-".

2 - Species: CN=cunner; DM=deployed mussels; IBM=indigenous blue mussels; LOB=lobster; MM=*Mercenaria mercenaria*; PM=*Pitar morrhuana*.

3 - Risk Ranking = maximum of species/station-specific rankings.

4 - Cunner measurements not available at JPC-1; values are for mummichog.

TSC-HQ = CoC concentration in organism tissue divided by the analyte-specific residue concentration presumed to be adverse to the organism.

Table 6.2-2b. Tissue Screening Concentration Hazard Quotients (TSC-HQ) Rankings for Target Receptors for the Derecktor Shipyard Marine ERA by Species<sup>1</sup>.

| Station            | Species <sup>2</sup> | Acenaphthene | Acenaphthylene | Anthracene | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b,j,k)fluoranthene | Benzo(g,h,i)perylene | Chrysene | Dibenz(a,h)anthracene | Fluoranthene | Fluorene | Indeno(1,2,3-cd)pyrene | Naphthalene | Phenanthrene | Pyrene | Total PCBs | p,p'-DDE | Tributyltin | Arsenic | Cadmium | Chromium | Copper | Lead | Mercury | Nickel | Silver | Zinc | Risk Ranking <sup>3</sup> |     |    |    |    |
|--------------------|----------------------|--------------|----------------|------------|--------------------|----------------|--------------------------|----------------------|----------|-----------------------|--------------|----------|------------------------|-------------|--------------|--------|------------|----------|-------------|---------|---------|----------|--------|------|---------|--------|--------|------|---------------------------|-----|----|----|----|
| DSY-26             | CN                   | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | .       | .       | +        | ++     | +    | .       | .      | .      | +    | ++                        |     |    |    |    |
| DSY-28             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | .       | .       | +        | ++     | +    | .       | .      | .      | +    | ++                        |     |    |    |    |
| DSY-29             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | .       | .       | .        | +      | ++   | +       | .      | .      | .    | +                         | ++  |    |    |    |
| DSY-36             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | .       | .       | .        | +      | ++   | +       | .      | .      | .    | +                         | ++  |    |    |    |
| JPC-1 <sup>4</sup> |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | .       | .       | .        | +      | ++   | +       | .      | .      | .    | +                         | ++  |    |    |    |
| CHC-1              | .                    | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | .       | .       | +        | ++     | +    | .       | .      | .      | +    | ++                        |     |    |    |    |
| DSY-26             | DM                   | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | +       | .       | +        | +      | ++   | +       | .      | .      | .    | +                         | ++  |    |    |    |
| DSY-28             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | .       | +       | +        | +      | ++   | +       | .      | .      | .    | +                         | ++  |    |    |    |
| DSY-29             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | .       | .       | +        | +      | +    | ++      | +      | .      | .    | .                         | +   | ++ |    |    |
| DSY-31             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | .       | .       | +        | +      | +    | ++      | +      | .      | .    | .                         | +   | ++ |    |    |
| DSY-33             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | .       | .       | .        | +      | +    | +       | ++     | +      | .    | .                         | .   | +  | ++ |    |
| DSY-38             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | .       | .       | .        | .      | ++   | +       | .      | +      | .    | .                         | .   | +  | ++ |    |
| DSY-39             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | .       | .       | .        | .      | +    | .       | .      | .      | .    | .                         | .   | +  | ++ |    |
| DSY-40             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | .       | .       | .        | .      | +    | .       | .      | .      | .    | .                         | .   | +  | ++ |    |
| JPC-1              |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | .       | .       | .        | .      | +    | .       | .      | .      | .    | .                         | .   | +  | ++ |    |
| CHC-1              |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | .       | +       | .        | .      | ++   | +       | .      | .      | .    | .                         | .   | +  | ++ |    |
| DSY-24             | IBM                  | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | .       | +       | +        | +      | +    | ++      | .      | .      | .    | .                         | ++  |    |    |    |
| DSY-25             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | .       | .       | +        | ++     | +    | .       | +      | .      | .    | .                         | +   | ++ |    |    |
| DSY-26             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | .       | .       | +        | ++     | +    | .       | .      | .      | .    | .                         | +   | ++ |    |    |
| DSY-27             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | ++      | .       | +        | +      | ++   | +       | .      | .      | .    | .                         | +   | ++ |    |    |
| DSY-28             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | .       | +       | +        | +      | ++   | +       | .      | .      | .    | .                         | +   | ++ |    |    |
| DSY-35             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | .       | .       | +        | +      | +    | ++      | +      | .      | .    | .                         | .   | +  | ++ |    |
| DSY-36             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | .       | .       | +        | +      | +    | ++      | +      | .      | .    | .                         | .   | +  | ++ |    |
| DSY-38             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | .       | .       | .        | +      | +    | +       | ++     | +      | .    | .                         | .   | .  | +  | ++ |
| DSY-40             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | .       | .       | +        | +      | +    | ++      | +      | .      | .    | .                         | .   | +  | ++ |    |
| JPC-1              |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | .       | .       | +        | +      | +    | ++      | +      | .      | .    | .                         | .   | +  | ++ |    |
| CHC-1              | .                    | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | +       | +       | +        | ++     | +    | .       | .      | .      | .    | .                         | +   | ++ |    |    |
| DSY-25             | LOB                  | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | .       | +       | +        | +      | +++  | .       | .      | .      | .    | .                         | +++ |    |    |    |
| DSY-27             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | .       | .       | +        | +++    | +    | .       | .      | .      | .    | .                         | +++ |    |    |    |
| DSY-28             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | .       | .       | +        | +++    | +    | .       | .      | .      | .    | .                         | +++ |    |    |    |
| DSY-29             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | .       | .       | +        | +++    | +    | .       | .      | .      | .    | .                         | +++ |    |    |    |
| DSY-33             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | .       | .       | +        | +++    | +    | .       | .      | .      | .    | .                         | +++ |    |    |    |
| DSY-35             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | .       | .       | +        | +++    | +    | .       | .      | .      | .    | .                         | +++ |    |    |    |
| DSY-36             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | .       | .       | +        | +++    | +    | .       | .      | .      | .    | .                         | +++ |    |    |    |
| DSY-38             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | .       | .       | +        | +++    | +    | .       | .      | .      | .    | .                         | +++ |    |    |    |
| DSY-39             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | .       | .       | +        | +++    | +    | .       | .      | .      | .    | .                         | +++ |    |    |    |
| JPC-1              |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | .       | .       | +        | +++    | +    | .       | .      | .      | .    | .                         | +++ |    |    |    |
| CHC-1              | .                    | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | +       | +       | +        | +++    | +    | .       | .      | .      | .    | +++                       |     |    |    |    |
| DSY-35             | MM                   | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | +       | .       | +        | +      | +    | .       | .      | .      | .    | .                         | +   |    |    |    |
| DSY-41             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | +       | .       | +        | ++     | +    | .       | .      | .      | .    | .                         | +   |    |    |    |
| JPC-1              |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | +       | .       | +        | +      | +    | .       | .      | .      | .    | .                         | +   |    |    |    |
| DSY-31             | PM                   | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | +       | .       | +        | +      | ++   | +       | .      | .      | .    | .                         | +   |    |    |    |
| DSY-32             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | +       | .       | +        | +      | +    | .       | .      | .      | .    | .                         | +   |    |    |    |
| DSY-33             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | +       | .       | +        | +      | +    | .       | .      | .      | .    | .                         | +   |    |    |    |
| DSY-34             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | +       | .       | +        | +      | +    | .       | .      | .      | .    | .                         | +   |    |    |    |
| DSY-35             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | +       | .       | +        | +      | +    | .       | .      | .      | .    | .                         | +   |    |    |    |
| DSY-36             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | +       | .       | +        | +      | ++   | +       | .      | .      | .    | .                         | +   |    |    |    |
| DSY-37             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | +       | .       | +        | +      | +    | .       | .      | .      | .    | .                         | +   |    |    |    |
| DSY-38             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | +       | .       | +        | +      | +    | .       | .      | .      | .    | .                         | +   |    |    |    |
| DSY-41             |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | +       | .       | +        | +      | ++   | +       | .      | .      | .    | .                         | +   |    |    |    |
| JPC-1              |                      | .            | .              | .          | .                  | .              | .                        | .                    | .        | .                     | .            | .        | .                      | .           | .            | .      | .          | .        | .           | +       | .       | +        | +      | ++   | +       | .      | .      | .    | .                         | +   |    |    |    |

1 - Species/Station-specific Rankings: TSC-HQ>40 = "+++"; TSC-HQ>10 = "++"; TSC-HQ>1 = "+"; TSC-HQ<1 or TSC-HQ=1 = "-".

2 - Species: CN=cunner; DM=deployed mussels; IBM=indigenous blue mussels; LOB=lobster; MM=*Mercenaria mercenaria*; PM=*Pitar morrhua*.

3 - Risk Ranking = maximum of species/station-specific rankings.

4 - Cunner measurements not available at JPC-1; values are for mummichog.

TSC-HQ = CoC concentration in organism tissue divided by the analyte-specific residue concentration presumed to be adverse to the organism.

Table 6.2-3a. Critical Body Residue Hazard Quotients (CBR-HQ) Rankings for Target Receptors for the Dereecktor Shipyard Marine ERA by Station<sup>1</sup>.

| Station | Species <sup>2</sup> | Total PAHs | Total PCBs | Pesticides | Butyltins | Metals | Risk Ranking <sup>3</sup> |
|---------|----------------------|------------|------------|------------|-----------|--------|---------------------------|
| DSY-24  | IBM                  | -          | -          | -          | -         | -      | -                         |
| DSY-25  | IBM                  | -          | -          | -          | -         | -      | -                         |
|         | LOB                  | -          | -          | -          | -         | +      | +                         |
| DSY-26  | CN                   | -          | -          | -          | -         | -      | -                         |
|         | DM                   | -          | -          | -          | -         | -      | -                         |
|         | IBM                  | -          | -          | -          | -         | -      | -                         |
| DSY-27  | IBM                  | -          | -          | -          | -         | -      | -                         |
|         | LOB                  | -          | -          | -          | -         | +      | +                         |
| DSY-28  | CN                   | -          | -          | -          | -         | -      | -                         |
|         | DM                   | -          | -          | -          | -         | -      | -                         |
|         | IBM                  | -          | -          | -          | -         | -      | -                         |
|         | LOB                  | -          | -          | -          | -         | -      | -                         |
| DSY-29  | CN                   | -          | -          | -          | -         | -      | -                         |
|         | DM                   | -          | -          | -          | -         | -      | -                         |
|         | LOB                  | -          | -          | -          | -         | +      | +                         |
| DSY-31  | DM                   | -          | -          | -          | -         | -      | -                         |
|         | PM                   | -          | -          | -          | -         | -      | -                         |
| DSY-32  | PM                   | -          | -          | -          | -         | -      | -                         |
| DSY-33  | DM                   | -          | -          | -          | -         | -      | -                         |
|         | LOB                  | -          | -          | -          | -         | -      | -                         |
|         | PM                   | -          | -          | -          | -         | -      | -                         |
| DSY-34  | PM                   | -          | -          | -          | -         | -      | -                         |
| DSY-35  | IBM                  | -          | -          | -          | -         | -      | -                         |
|         | LOB                  | -          | -          | -          | -         | +      | +                         |
|         | MM                   | -          | -          | -          | -         | -      | -                         |
|         | PM                   | -          | -          | -          | -         | -      | -                         |
| DSY-36  | CN                   | -          | -          | -          | -         | -      | -                         |
|         | IBM                  | -          | -          | -          | -         | -      | -                         |
|         | LOB                  | -          | -          | -          | -         | -      | -                         |
|         | PM                   | -          | -          | -          | -         | -      | -                         |
| DSY-37  | PM                   | -          | -          | -          | -         | -      | -                         |
| DSY-38  | DM                   | -          | -          | -          | -         | -      | -                         |
|         | LOB                  | -          | -          | -          | -         | +      | +                         |
|         | PM                   | -          | -          | -          | -         | -      | -                         |
| DSY-39  | DM                   | -          | -          | -          | -         | -      | -                         |
|         | LOB                  | -          | -          | -          | -         | +      | +                         |
| DSY-40  | DM                   | -          | -          | -          | -         | -      | -                         |
|         | IBM                  | -          | -          | -          | -         | -      | -                         |
| DSY-41  | MM                   | -          | -          | -          | -         | -      | -                         |
|         | PM                   | -          | -          | -          | -         | -      | -                         |
| JPC-1   | CN <sup>4</sup>      | -          | -          | -          | -         | -      | -                         |
|         | DM                   | -          | -          | -          | -         | -      | -                         |
|         | IBM                  | -          | -          | -          | -         | -      | -                         |
|         | LOB                  | -          | -          | -          | -         | +      | +                         |
|         | MM                   | -          | -          | -          | -         | -      | -                         |
|         | PM                   | -          | -          | -          | -         | -      | -                         |
| CHC-1   | CN                   | -          | -          | -          | -         | -      | -                         |
|         | DM                   | -          | -          | -          | -         | -      | -                         |
|         | IBM                  | -          | -          | -          | -         | -      | -                         |
|         | LOB                  | -          | -          | -          | -         | +      | +                         |
| T-0     | DM                   | -          | -          | -          | -         | -      | -                         |

1 - Analyte-specific Rankings: CBR-HQ<1 = "-"; CBR-HQ>1 = "+"; CBR-HQ>3 = "++"; CBR-HQ>40 = "+++".

2 - Species: CN=cunner; DM=deployed mussels; IBM=indigenous blue mussels; LOB=lobster; MM=*Mercenaria mercenaria*; PM=*Pitar morrhuana*.

3 - Species/Station-specific Rankings: maximum of analyte-specific rankings.

4 - Cunner measurements not available at JPC-1; values are for mummichog.

Table 6.2-3b. Critical Body Residue Hazard Quotients (CBR-HQ) Rankings for Target Receptors for the Dorekktor Shipyard Marine ERA by Species<sup>1</sup>.

| Station  | Species <sup>2</sup> | Total PAHs  | Total PCBs  | Pesticides  | Butyltins   | Metals  | Risk Ranking <sup>3</sup>                           |
|--|----------------------|---|---|---|---|---|---|
| DSY-26<br>DSY-28<br>DSY-29<br>DSY-36<br>JPC-1 <sup>4</sup><br>CHC-1                                      | CN                   | -<br>-<br>-<br>-<br>-<br>-                          | -<br>-<br>-<br>-<br>-<br>-                          | -<br>-<br>-<br>-<br>-<br>-                          | -<br>-<br>-<br>-<br>-<br>-                          | -<br>-<br>-<br>-<br>-<br>-                          | -<br>-<br>-<br>-<br>-<br>-                          |
| DSY-26<br>DSY-28<br>DSY-29<br>DSY-31<br>DSY-33<br>DSY-38<br>DSY-39<br>DSY-40<br>JPC-1<br>CHC-1<br>T-0    | DM                   | -<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>- | -<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>- | -<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>- | -<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>- | -<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>- | -<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>- |
| DSY-24<br>DSY-25<br>DSY-26<br>DSY-27<br>DSY-28<br>DSY-35<br>DSY-36<br>DSY-40<br>JPC-1<br>CHC-1           | IBM                  | -<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>- | -<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>- | -<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>- | -<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>- | -<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>- | -<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>- |
| DSY-25<br>DSY-27<br>DSY-28<br>DSY-29<br>DSY-33<br>DSY-35<br>DSY-36<br>DSY-38<br>DSY-39<br>JPC-1<br>CHC-1 | LOB                  | -<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>- | -<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>- | -<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>- | -<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>- | +<br>+<br>-<br>+<br>-<br>+<br>-<br>+<br>+<br>+<br>+ | +<br>+<br>-<br>+<br>-<br>+<br>-<br>+<br>+<br>+<br>+ |
| DSY-35<br>DSY-41<br>JPC-1  | MM                   | -<br>-<br>-   | -<br>-<br>-   | -<br>-<br>-   | -<br>-<br>-   | -<br>-<br>-   | -<br>-<br>-   |
| DSY-31<br>DSY-32<br>DSY-33<br>DSY-34<br>DSY-35<br>DSY-36<br>DSY-37<br>DSY-38<br>DSY-41<br>JPC-1          | PM                   | -<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-      | -<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-      | -<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-      | -<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-      | -<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-      | -<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-      |

1 - Analyte-specific Rankings: CBR-HQ < 1 = "-"; CBR-HQ > 1 = "+"; CBR-HQ > 3 = "++"; CBR-HQ > 40 = "+++".

2 - Species: CN=cunner; DM=deployed mussels; IBM=indigenous blue mussels; LOB=lobster;

MM=*Mercenaria mercenaria*; PM=*Pitar morrhuana*.

3 - Species/Station-specific Rankings: maximum of analyte-specific rankings.

4 - Cunner measurements not available at JPC-1; values are for mummichog.

Table 6.2-4. Tissue Residue Effects Rankings for the Derecktor Shipyard Marine Ecological Risk Assessment.

| Station            | Cunner              |                     |                           | Deployed Mussels    |                     |                           | Indigenous Mussels  |                     |                           | Lobster             |                     |                           | Mercenaria          |                     |                           | Pitar               |                     |                           |
|--------------------|---------------------|---------------------|---------------------------|---------------------|---------------------|---------------------------|---------------------|---------------------|---------------------------|---------------------|---------------------|---------------------------|---------------------|---------------------|---------------------------|---------------------|---------------------|---------------------------|
|                    | TCS-HQ <sup>1</sup> | CBR-HQ <sup>2</sup> | Risk Ranking <sup>3</sup> | TCS-HQ <sup>1</sup> | CBR-HQ <sup>2</sup> | Risk Ranking <sup>3</sup> | TCS-HQ <sup>1</sup> | CBR-HQ <sup>2</sup> | Risk Ranking <sup>3</sup> | TCS-HQ <sup>1</sup> | CBR-HQ <sup>2</sup> | Risk Ranking <sup>3</sup> | TCS-HQ <sup>1</sup> | CBR-HQ <sup>2</sup> | Risk Ranking <sup>3</sup> | TCS-HQ <sup>1</sup> | CBR-HQ <sup>2</sup> | Risk Ranking <sup>3</sup> |
| DSY-24             |                     |                     |                           |                     |                     |                           | ++                  | .                   | ++                        |                     |                     |                           |                     |                     |                           |                     |                     |                           |
| DSY-25             |                     |                     |                           |                     |                     |                           | ++                  | .                   | ++                        | +++                 | +                   | +++                       |                     |                     |                           |                     |                     |                           |
| DSY-26             | ++                  | -                   | ++                        | ++                  | .                   | ++                        | +                   | .                   | +                         | ++                  | +                   | +++                       |                     |                     |                           |                     |                     |                           |
| DSY-27             |                     |                     |                           |                     |                     |                           | ++                  | .                   | ++                        | +++                 | +                   | +++                       |                     |                     |                           |                     |                     |                           |
| DSY-28             | ++                  | .                   | ++                        | +                   | .                   | +                         | +                   | .                   | +                         | .                   | .                   | .                         |                     |                     |                           |                     |                     |                           |
| DSY-29             | ++                  | .                   | ++                        | +                   | .                   | +                         |                     |                     |                           | +++                 | +                   | +++                       |                     |                     |                           |                     |                     |                           |
| DSY-30             |                     |                     |                           |                     |                     |                           |                     |                     |                           |                     |                     |                           |                     |                     |                           |                     |                     |                           |
| DSY-31             |                     |                     |                           | +                   | .                   | +                         |                     |                     |                           |                     |                     |                           |                     |                     |                           | ++                  | .                   | ++                        |
| DSY-32             |                     |                     |                           |                     |                     |                           |                     |                     |                           |                     |                     |                           |                     |                     |                           | +                   | .                   | +                         |
| DSY-33             |                     |                     |                           | +                   | .                   | +                         |                     |                     |                           | +++                 | -                   | +++                       |                     |                     |                           | +                   | .                   | +                         |
| DSY-34             |                     |                     |                           |                     |                     |                           |                     |                     |                           |                     |                     |                           |                     |                     |                           | +                   | .                   | +                         |
| DSY-35             |                     |                     |                           |                     |                     |                           | +                   | .                   | +                         | +++                 | +                   | +++                       | +                   | .                   | +                         | +                   | .                   | +                         |
| DSY-36             | ++                  | -                   | ++                        |                     |                     |                           | +                   | .                   | +                         | +++                 | -                   | +++                       |                     |                     |                           | ++                  | .                   | ++                        |
| DSY-37             |                     |                     |                           |                     |                     |                           |                     |                     |                           |                     |                     |                           |                     |                     |                           | +                   | .                   | +                         |
| DSY-38             |                     |                     |                           | ++                  | -                   | ++                        |                     |                     |                           |                     |                     |                           |                     |                     |                           | +                   | .                   | +                         |
| DSY-39             |                     |                     |                           | +                   | -                   | +                         |                     |                     |                           | +++                 | +                   | +++                       |                     |                     |                           |                     |                     |                           |
| DSY-40             |                     |                     |                           | +                   | -                   | +                         | +                   | .                   | +                         | +++                 | +                   | +++                       |                     |                     |                           |                     |                     |                           |
| DSY-41             |                     |                     |                           |                     |                     |                           |                     |                     |                           |                     |                     |                           | ++                  | -                   | ++                        | ++                  | -                   | ++                        |
| JPC-1 <sup>4</sup> | ++                  | -                   | ++                        | +                   | -                   | +                         | +                   | -                   | +                         | +++                 | +                   | +++                       | +                   | -                   | +                         | ++                  | -                   | ++                        |
| CHC-1              | ++                  | -                   | ++                        | ++                  | -                   | ++                        | ++                  | -                   | ++                        | +++                 | +                   | +++                       |                     |                     |                           |                     |                     |                           |

1 - TSC-HQ = Tissue Screening Concentration Hazard Quotients; see Table 6.2-2.

2 - CBR-HQ = Critical Body Residue Hazard Quotients; see Table 6.2-3.

3 - Species-specific ranking = maximum of indicator-specific rankings.

4 - Cunner measurements not available at JPC-1; values are for mummichog.